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Miyamoto et al.

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(54) **OPTICAL INFORMATION MEDIUM, AND METHOD AND APPARATUS FOR FABRICATING THE SAME**

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(56) References Cited

U.S. PATENT DOCUMENTS

4,670,077 6/1987 Peeters .
4,995,799 * 2/1991 Hayashi et al. 425/111
5,023,167 6/1991 Kalyanaraman et al. .

5,296,340 3/1994 Tsukada et al. .
5,470,691 11/1995 Arai et al. .
5,549,952 8/1996 Arai et al. .
5,705,247 1/1998 Arai et al. .
5,744,193 * 4/1998 Kitano 156/74
5,800,670 * 9/1998 Kitano 156/74
5,843,257 * 12/1998 Inouchi 156/74

FOREIGN PATENT DOCUMENTS

63119040 5/1988 (JP) .
3209640 9/1991 (JP) .
351782 11/1991 (JP) .
4-271031 9/1992 (JP) .
6274940 9/1994 (JP) .
750035 2/1995 (JP) .
706178 4/1996 (JP) .
94-8469 4/1994 (KR) .

OTHER PUBLICATIONS

Korean Patent office Action in corresponding Korean Application No. 96-3660, dated Oct. 28, 1998 (4 pp.).

* cited by examiner

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(57) ABSTRACT

The disk-shaped optical information medium of this invention includes: a first substrate having a center hole; a second substrate having a center hole; and a radiation curable resin interposed between the first and second substrates for bonding together the first and second substrates, wherein the optical information medium further includes a stopper for preventing the radiation curable resin from protruding into the center holes of the substrates, and a space between the first and second substrates of at least a half of a clamp region for clamping the optical information medium is filled with the resin.

9 Claims, 17 Drawing Sheets

